

IN THE CLAIMS

1. (Currently Amended) A method for producing a replication master (10) having a surface with low roughness, comprising the steps of:

forming said master (10) such as to have a desired external surface shape which at least partially corresponds to a counterform of a surface of an object (18, 20) to be produced by replication;

treating said external surface of said master (10) to obtain a predetermined surface roughness value; and

coating at least a part of said master (10) with a smoothening layer (16),

wherein said smoothening layer (16) is made of a soluble material having a flowability such that the top surface of said smoothening layer displays a smaller roughness than the surface on which it is formed.

2. (Previously presented) The method according to claim 1, wherein said smoothening layer (16) is applied by dip-coating or spin-coating said master (10) with a liquid smoothening material and hardening said smoothening material.

3. (Previously presented) The method according to claim 1 which furthermore comprises the step of coating at least a part of said master (10) with a release layer.

4. (Previously presented) The method according to claim 3, wherein said release layer is made of a soluble material.

5. (Previously presented) The method according to claim 1, which furthermore comprises the step of coating at least one additional smoothening layer on top of or under said soluble smoothening layer (16).

6. (Previously presented) The method according to claim 5, wherein at least one of said additional smoothening layers is made of a non-soluble material.

7. (Previously presented) The method according to claim 5, which furthermore comprises the step of coating a thin spacer layer, preferably a thin metallic spacer layer, between at least two adjacent smoothening layers.

8. (Currently Amended) A replication method for producing a smooth object (18, 20) having a low surface roughness, comprising the steps of:

producing a replication master (10) by: ~~a method according to claim 1 or claim 3;~~

forming said master (10) such as to have a desired external surface shape which at least partially corresponds to a counterform of a surface of an object (18, 20) to be produced by replication,

treating said external surface of said master (10) to obtain a predetermined surface roughness value, and

coating at least a part of said master (10) with a smoothing layer (16) made of a soluble material having a flowability such that the top surface of said smoothing layer displays a smaller roughness than the surface on which it is formed;

coating at least a part of said master (10) with an object material such that the surface of said object (18, 20) corresponds to a counterform of said master (10); and

releasing said object (18, 20) from said master (10).

9. (Previously presented) The method according to claim 8, wherein said releasing step comprises dissolving at least one of said smoothing layer (16) and said release layer on top of said master (10) by a solvent.

10. (Currently Amended) The method according to claim 8, which furthermore comprises the step of providing glue (20) to at least one of said object (18, 20) and an object support (12) and ~~glueing~~ gluing them together before executing said releasing step.

11. (Previously presented) The method according to claim 10, wherein the amount of said glue (20) is chosen such as to fill gaps between said object (18, 20) and said object support (12).

12. (Previously presented) The method according to claim 8, wherein said object (18) is an optical device (18), e.g. a reflection or transmission monolayer, bilayer or multilayer.

13. (Previously presented) The method according to claim 12, which furthermore comprises the step of characterizing said optical device (18) on top of said master (10) before executing said releasing step.
14. (Previously presented) The method according to claim 13, wherein said characterization step comprises performing a profilometry or reflectometry measurement of said optical device (18).
15. (Previously presented) The method according to claim 8, wherein said object (20) is a substrate (20a) for an optical device (18).
16. (Previously presented) The method according to claim 15 and claim 10, wherein said object material and the material of said glue (20) are identical.
17. (Previously presented) The method according to claim 16, wherein said object material and said glue (20) comprise epoxy resin.
18. (Previously presented) The method according to claim 15, which furthermore comprises the step of coating at least a part of said master (10) with a protection layer on top of said smoothing layer (16) or release layer before applying said object material.
19. (Currently Amended) A replication master (10) for producing a smooth object (18, 20) having a low surface roughness, said master (10) having an external surface shape which at least partially corresponds to a counterform of a surface of said object (18, 20), wherein at least a part of said master (10) is coated with a smoothing layer (16), wherein said smoothing layer (16) is made of a soluble material having a flowability such that the top surface of said smoothing layer displays a smaller roughness than the surface on which it is formed.
20. (Previously presented) The replication master (10) according to claim 19, which is furthermore at least partially coated with a release layer.

21. (Previously presented) The replication master (10) according to claim 20, wherein said release layer is made of a soluble material.
22. (Previously presented) The method according to claim 1, wherein said soluble material is a soluble polymer material.
23. (Previously presented) The method according to claim 22, wherein said soluble polymer material is a PMMA photoresist.
24. (Previously presented) The method according to claim 4, wherein said release layer is made of a soluble polymer material.
25. (Previously presented) The method according to claim 24, wherein said release layer is made of a PMMA photoresist.
26. (Previously presented) The replication master according to claim 19, wherein said soluble material is a soluble polymer material.
27. (Previously presented) The replication master according to claim 26, wherein said soluble polymer material is a PMMA photoresist.
28. (Previously presented) The replication master (10) according to claim 21, wherein said release layer is made of a soluble polymer material.
29. (Previously presented) The replication master (10) according to claim 28, wherein said release layer is made of a PMMA photoresist.